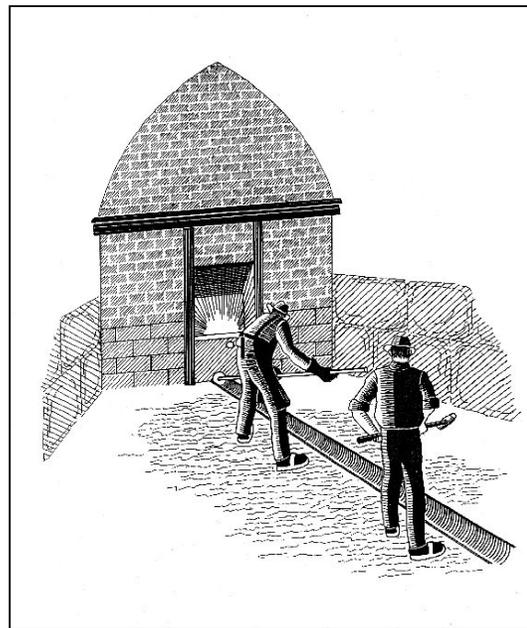
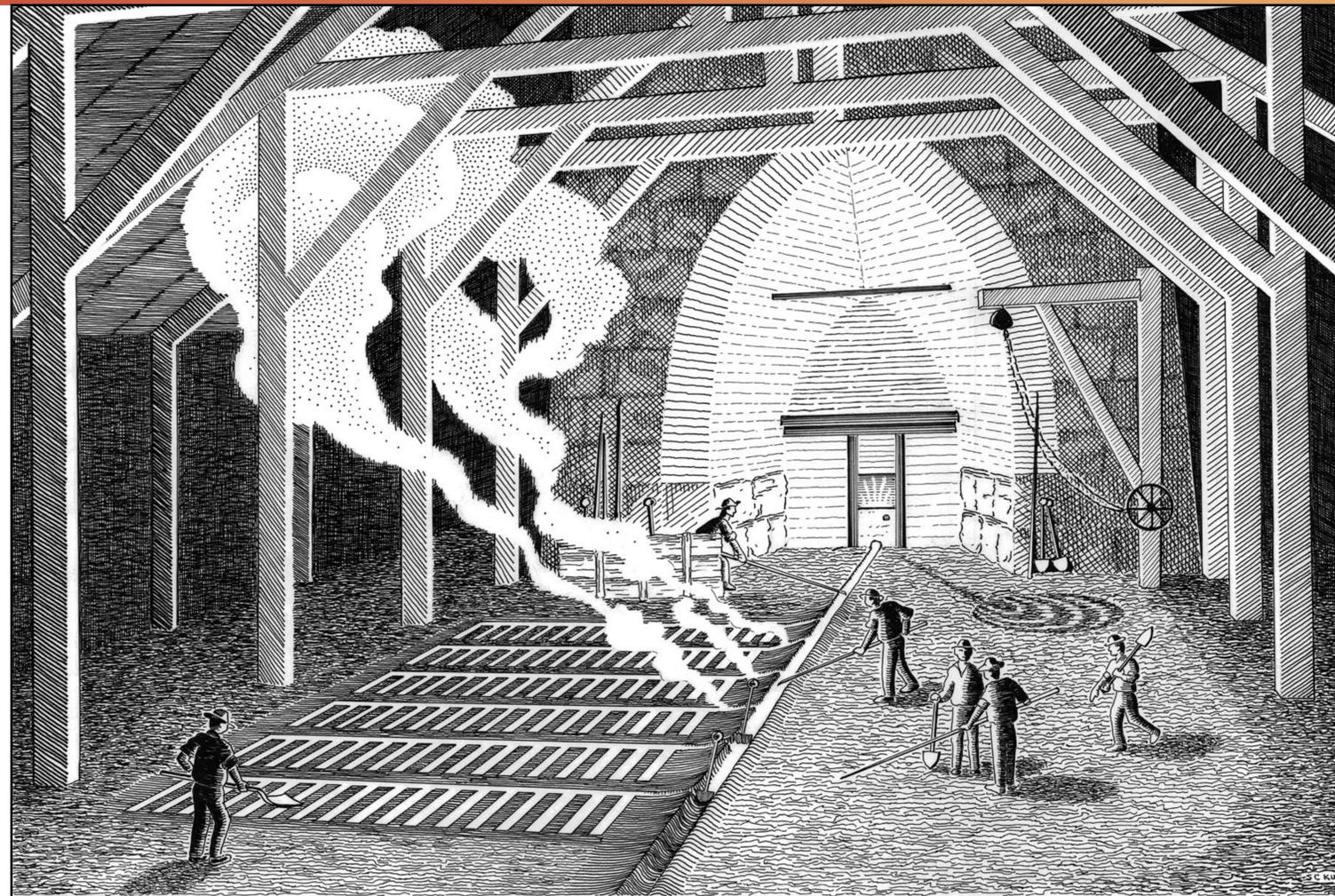


Inside the Casting House



TAPPING THE FURNACE



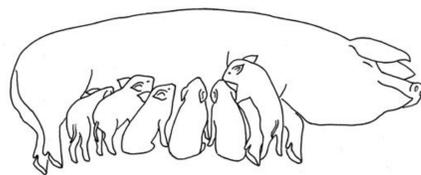
CASTING PIG IRON

How was Pig Iron Used?

Pig iron is a crude form of iron in the shape of bars. Its high carbon content, typically 3.5%, makes it brittle and of limited use until some of the carbon is removed by further processing in a foundry. The main difference between cast iron, steel, and wrought iron is the amount of carbon they contain. Carbon makes iron rigid and hard so it is suitable for things like pipe and cast iron stoves. Iron that has low carbon is malleable and tough. It can be heated and hammered into products like horseshoes and wrought iron railings. Pig iron from the Oswego Furnace was sold to foundries in Portland and San Francisco. Two of its most important uses were for pipe in Portland's water system and for the cast iron building fronts that gave early Portland its distinctive European look. Today Portland boasts the second largest collection of cast iron-fronted buildings in the nation and the majority were made from Oregon iron.

How was Pig Iron Made?

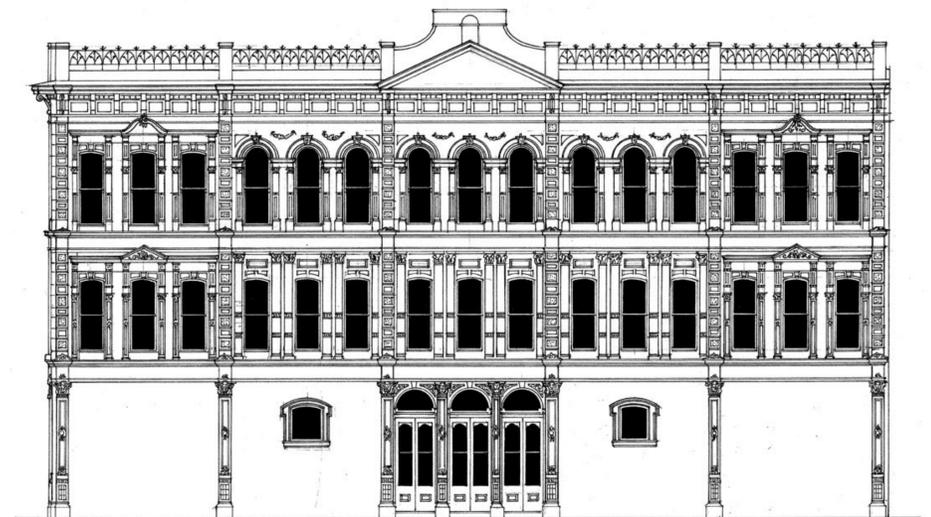
The casting house was a large open building with a sand floor. Several times a day the keeper opened the "slag notch," a hole on top of the dam stone, and let the slag floating on top of the liquid iron in the crucible run into a pit on one side of the casting floor. Once cooled, this glassy waste material was broken up and dumped on the riverbank.



Every six to twelve hours, workers called "guttermen" prepared molds in the sand. When enough iron had accumulated in the bottom of the furnace, the keeper broke a clay plug in the bottom of the dam stone releasing a stream of white-hot metal. The iron poured down a long channel and filled a row of trenches in the sand. The sand had to be damp to hold its shape, but too much moisture could cause a steam explosion.

Early ironworkers saw a resemblance in the pattern of molds to a sow nursing piglets. So they named the long trenches "sows" and the short trenches "pigs." Bars of iron made by this method are called "pig iron." When the pigs cooled to a dull red, they were broken off the sow with a sledgehammer. A bar of pig iron was about three feet long and weighed from 80 to 100 pounds.

Workers had little protection, other than wooden clogs, from splashes of molten metal. Temperatures in the casting house could reach 120 degrees. Blast furnaces ran night and day without stopping for about ten months unless a problem required a shutdown.



The 1883 Smith and Watson Building, one of Portland's cast iron masterpieces, was demolished in 1974. Illustration courtesy of William John Hawkins III, *The Grand Era of Cast-Iron Architecture in Portland* (1976).

The Effect of Carbon in Different Kinds of Iron (Percent of carbon by weight)

CAST IRON 4% to 2%

STEEL 1.7% to .02%

WROUGHT IRON .04 % to .002%

high carbon iron (crystalline, rigid, can be cast in molds)

pure iron (fibrous, malleable)